IN THE SPECIFICATION

Please replace the paragraph beginning at page 3, line 6, with the following rewritten paragraph:

Such conventional EGR cooler has poor heat exchange efficiency since the exhaust gas 10 flows straight in the tubes 3 and insufficiently contacts the inner peripheries of the tubes 3. Therefore, it has been proposed that an inner periphery of the tube 3 is formed with spiral protrusions to causes the exhaust gas 10 passing through the tube 3 to be whirled, thereby increasing contact frequency and contact distance of the exhaust gas 10 to the inner periphery of the tube 3 to enhance the heat exchange efficiency of the EGR cooler.

Please replace the paragraph beginning at page 3, line 16, with the following rewritten paragraph:

However, a design concept conventionally adopted for formation of a spiral protrusion on the inner periphery of the tube 3 is such that an inclination angle (to a plane perpendicular to an axis of the tube 3) of the spiral protrusion is minimized in merely focusing attention on initial performance value. It has been revealed, from experimental results by the inventor, that application of such design concept to [[an]] a diesel engine from which the exhaust gas 10 with much sooty contents is discharged ~~unsmooths~~ disturbs the flow of the exhaust gas 10 since the inclination angle of the spiral protrusion is small, resulting in an accumulation of soot within the tube 3 with a lapse of time, [[and]] thus ~~substantial~~ substantially lowering [[of]] the heat exchange efficiency.

Please replace the paragraph beginning at page 4, line 19, with the following rewritten paragraph:

Such inclination angle of the spiral protrusion set to 26°-50° is slightly inferior in initial performance value on heat exchange efficiency in comparison with an inclination angle of less than 26°, but keeps the exhaust gas in a state so as to have less pressure loss and causes it to flow smoothly with a tendency of the soot not to accumulate on the inner periphery of the tube, and therefore is superior in eventual performance value on heat exchange efficiency after deterioration; in view of long use thereafter, it turns out that there is a prolonged time period with good heat exchange efficiency maintained.

Please replace the paragraph beginning at page 5, line 6, with the following rewritten paragraph:

In fact, it has been ensured by the inventor's experiments that the inclination angle of spiral protrusion being set to less than 26° increases the pressure loss so that soot tends to accumulate in the tube, resulting in a substantial lowering in performance. It has been also ensured that, with the inclination angle of the spiral protrusion in a range of 26°-50°, the eventual performance value after deterioration substantially stays flat.

Please replace the paragraph beginning at page 5, line 14, with the following rewritten paragraph:

On the other hand, it has been ensured that even with the inclination angle [[of]] being more than 50°, [[it]] such hardly contributes to a lowering in pressure loss of the exhaust gas while an amount of heat exchanged tends to be drastically decreased by a slight increase in inclination angle[[; moreover]]. Moreover, insufficiency of whirling force afforded to the exhaust gas remarkably impairs the function of the soot in the exhaust gas gathering to the

whirling axis[[; as]]. As a result, inversely there may be a tendency of the soot to accumulate on the inner periphery of the tube.

Please replace the paragraph beginning at page 5, line 24, with the following rewritten paragraph:

Moreover, according to the invention, preferably the inner periphery of the tube is formed with a plurality of strands of spiral protrusions running without crossing and with phases peripherally shifted with respect to each other. This enables the axial pitch of the protrusions to be decreased with [[the]] an inclination angle of the spiral protrusion of more than 26°, whereby whirling force of the exhaust gas can be increased without increasing the pressure loss.

Please insert the following paragraph at page 6, between lines 11 and 12:

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Please replace the paragraph beginning at page 6, line 16, with the following rewritten paragraph:

Fig. 3 is a schematic section showing the ridge height of spiral protrusion in Fig. 2;

Please replace the paragraph beginning at page 6, line 18, with the following rewritten paragraph:

Fig. 4 is a graph showing a relationship between the heat exchange efficiency and inclination angle of the spiral protrusion;

Please replace the paragraph beginning at page 6, line 21, with the following rewritten paragraph:

Fig. 5 is an illustration [[on]] of the pitch when the protrusion is in one streak; and

Please replace the heading at page 7, line 1 with the following heading:

Best ~~Mode~~ Modes for Carrying Out the Invention

Please replace the paragraph beginning at page 7, line 7, with the following rewritten paragraph:

As shown in Fig. 2, this embodiment is directed to an EGR cooler constructed substantially in the same manner as described above with respect to Fig. 1, and an inner periphery of the tube 3 through which exhaust gas 10 passes is formed with a plurality of streaks of spiral protrusions 12 and 13 with inclination angle θ being in a range of 26°-50° relative to a plane perpendicular to an axis of the tube 3. In the example shown, two streaks of spiral protrusions 12 and 13 run without crossing and with phases peripherally shifted [[at]] 180° with respect to each other.

Please replace the paragraph beginning at page 7, line 17, with the following rewritten paragraph:

If the tube 3 is thin in terms of wall thickness, the spiral protrusions 12 and 13 may be formed by spirally indenting the tube 3 from outside by means of, for example, a roll having spiral convex streaks, so that portions pressed from outside provide the spiral protrusions 12 and 13 on the inner periphery of the tube 3.

Please replace the paragraph beginning at page 7, line 23, with the following rewritten paragraph:

If the tube 3 is thick in terms of wall thickness, the spiral protrusions 12 and 13 may be formed by cutting the inner periphery of the tube 3 so as to leave the spiral protrusions 12 and 13.

Please replace the paragraph beginning at page 8, line 7, with the following rewritten paragraph:

~~Because,~~ While the ridge height h of the spiral protrusions 12 and 13 being more than 15% would result in worthless increase of pressure loss[[; that]], a ridge height being less than 5% would result in too small a whirling force by the spiral protrusions 12 and 13 and loose the worth of forming the spiral protrusions 12 and 13.

Please replace the paragraph beginning at page 8, line 13, with the following rewritten paragraph:

Thus, such inclination angle θ of the spiral protrusions 12 and 13 set to the range of 26°-50° is slightly inferior in initial performance value [[on]] in terms of heat exchange efficiency in comparison with an inclination angle θ of less than 26°, but keeps the exhaust

gas 10 to have less pressure loss and causes it to flow smoothly with tendency of the soot not to accumulate on the inner periphery of the tube 3, and therefore is superior in eventual performance value [[on]] in terms of heat exchange efficiency after deterioration[[; in]]. In view of long use thereafter, it turns out that there is a prolonged time period with good heat exchange efficiency maintained.

Please replace the paragraph beginning at page 8, line 25, with the following rewritten paragraph:

In fact, according to experiments conducted by the inventor, experimental results have been obtained for example as shown in the graph in Fig. 4 (which shows relationship between heat exchange efficiency and inclination angle). As is clear from this graph, it has been ensured that [[the]] an inclination angle θ of the spiral protrusions 12 and 13 of less than 26° increases the pressure loss so that soot tends to accumulate in the tube 3, resulting in substantial lowering in performance (lowering in heat exchange efficiency). It has been also ensured that, with the inclination angle θ of the spiral protrusions 12 and 13 in the range of 26°-50°, the eventual performance value after deterioration stays substantially ~~stays~~ flat. The graph in Fig. 4 shows, with respect to two examples of the spiral protrusions 12 and 13 with different ridge heights, differences between initial performance value and eventual performance value after deterioration.

Please replace the paragraph beginning at page 9, line 18, with the following rewritten paragraph:

Now, eventual performance value after deterioration will be explained. With a lapse of time after activation of the EGR cooler, accumulation of soot in the tube 3 progresses, which lowers the heat exchange efficiency and increases the pressure loss of the exhaust gas

10, finally maturing into a (saturated) state where accumulation of soot does not increase any more to stabilize the heat exchange efficiency and the pressure loss. The performance value at this stage is regarded as the eventual performance value after deterioration.

Please replace the paragraph beginning at page 10, line 3, with the following rewritten paragraph:

Studying an appropriately sized EGR cooler in view of its mountability into an engine room on the basis of the various experimental results as mentioned above leads to a most effective and suitable condition and that the inclination angle θ of the spiral protrusions 12 and 13 is specified into the range of 26°-50°.

Please replace the paragraph beginning at page 11, line 10, with the following rewritten paragraph:

Especially in this embodiment, the inner periphery of the tube 3 is formed with two streaks of spiral protrusions 12 and 13 running without crossing and with phases peripherally shifted to each other, so that the axial pitch P of the protrusions 12 and 13 can be decreased with the inclination angle θ of the spiral protrusions 12 and 13 being more than 26°, which enables the whirling force of the exhaust gas 10 to be increased without increasing the pressure loss.

Please replace the paragraph beginning at page 11, line 23, with the following rewritten paragraph:

(I) In order to make the exhaust gas flow spirally within the tube for the purpose of enhancing the heat exchange efficiency, the inclination angle of the spiral protrusion is set to a range of 26°-50° so that accumulation of soot on the inner periphery of the tube can be suppressed to

maintain a higher [[the]] eventual performance value after deterioration than that in the conventional design concept which merely focuses attention on initial performance value, whereby an EGR cooler is provided which can be satisfactorily applied with no substantial lowering in performance to a diesel engine from which is discharged exhaust gas rich with sooty contents.